Jan. 12, 1943. A. N. GRAY 2,307,925

WIRE COATING APPARATUS

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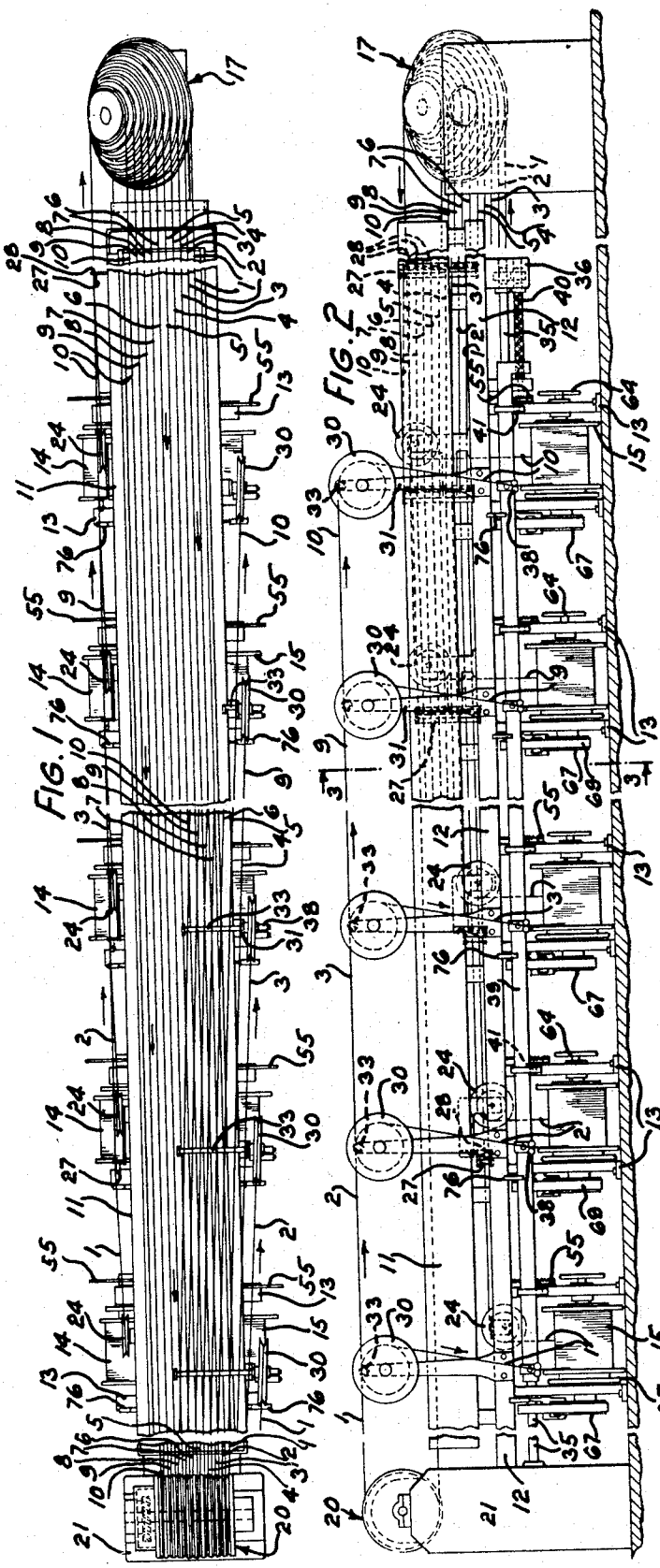


FIG. 1

FIG. 2

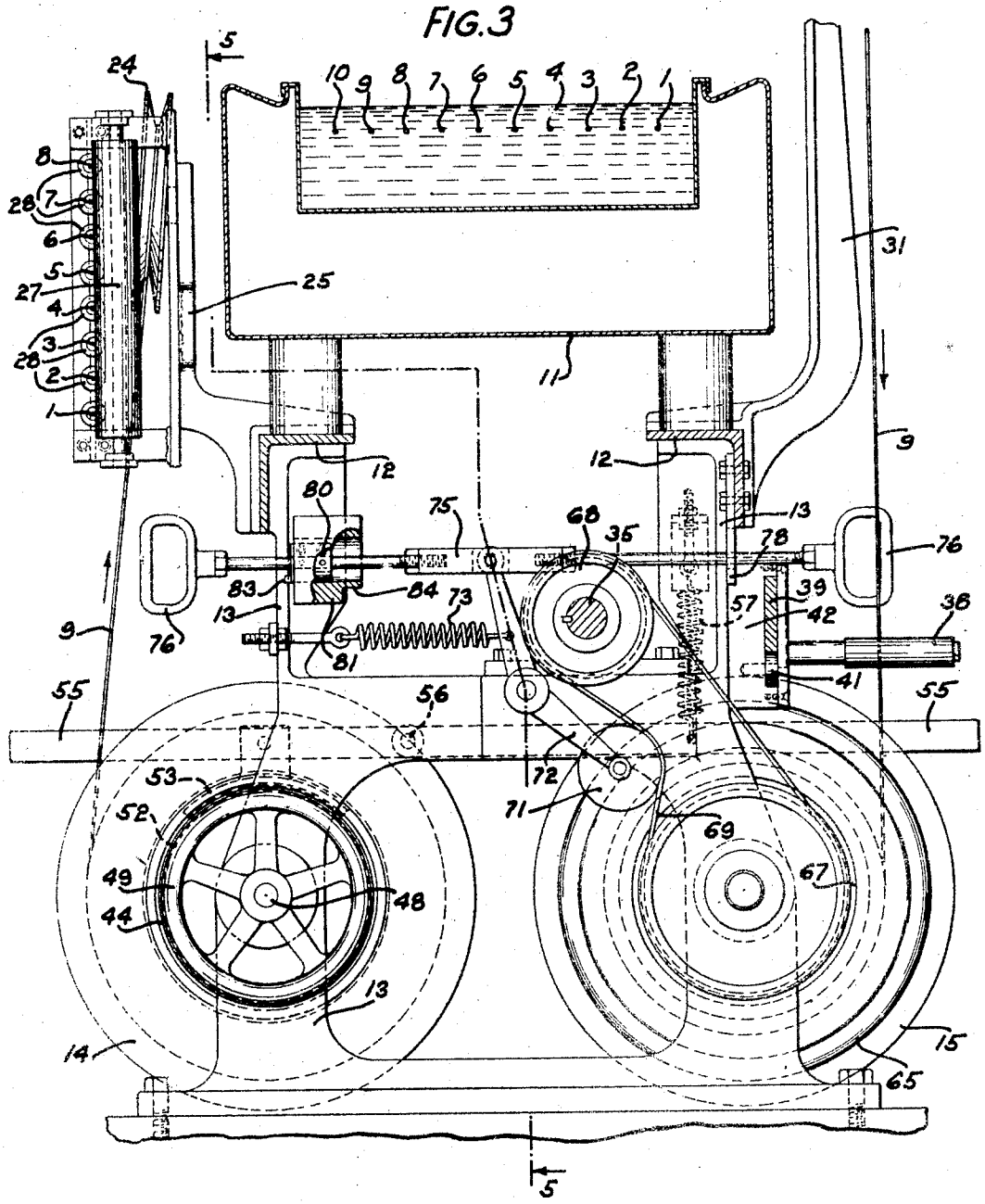
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FIG. 3



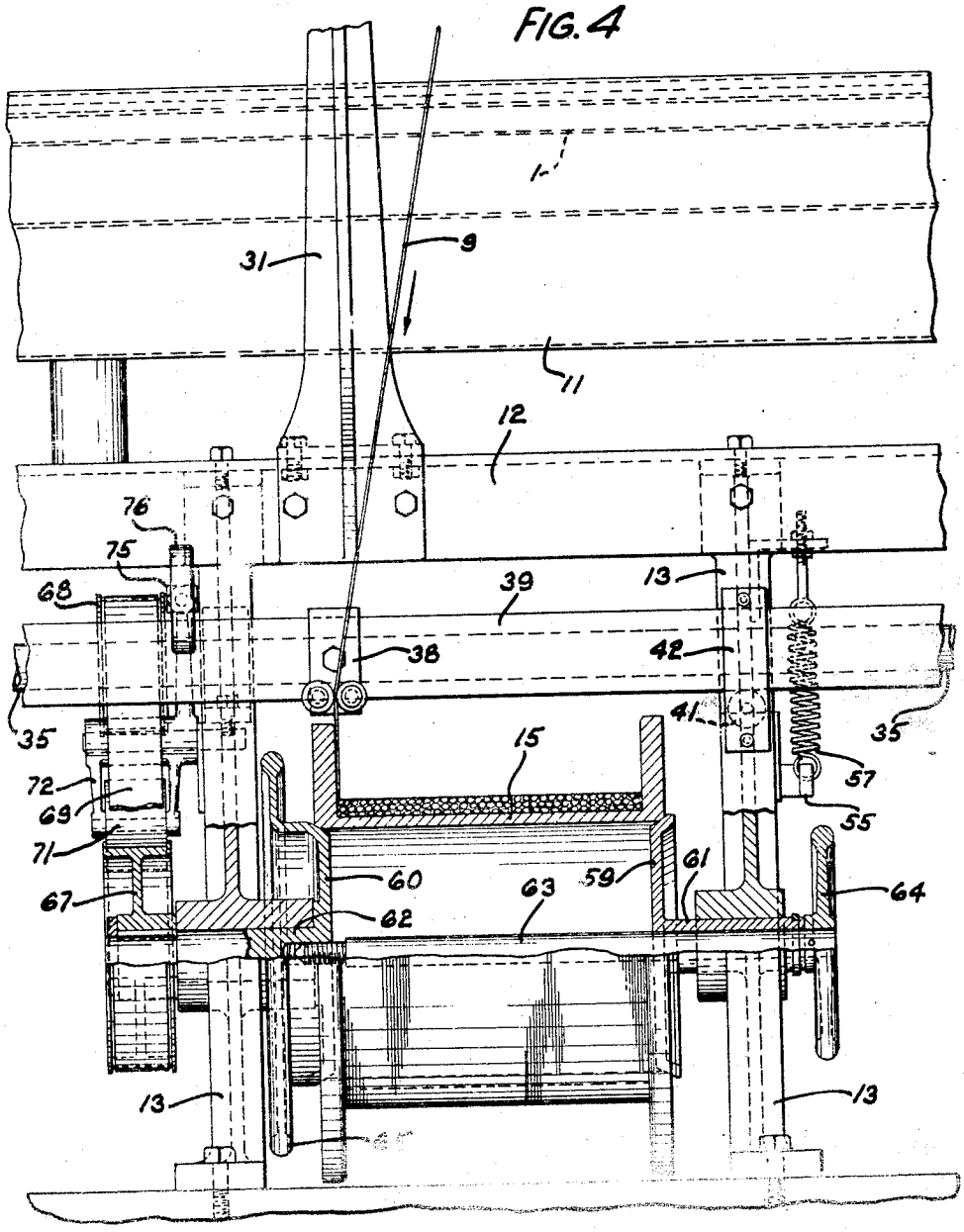
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FIG. 4



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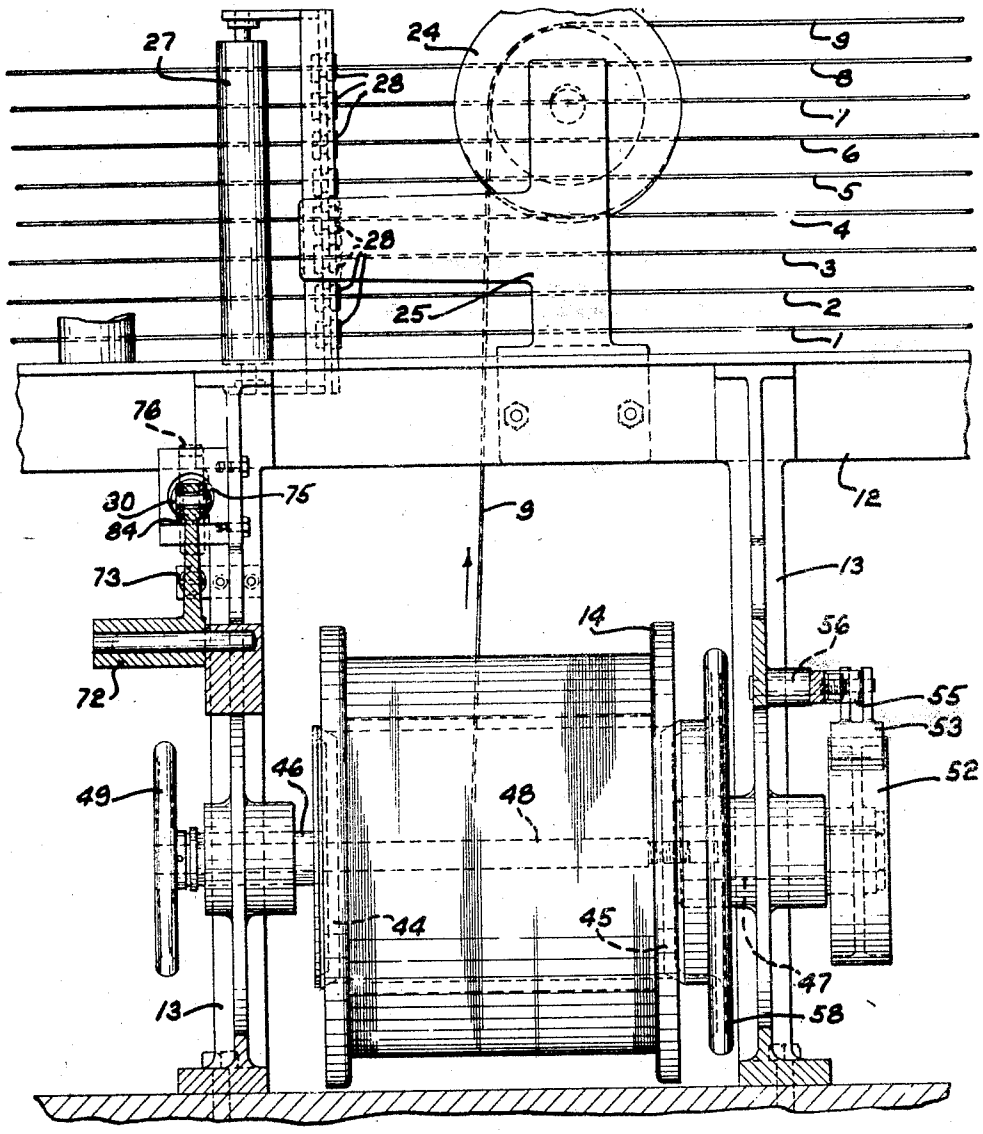


FIG. 5

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WIRE COATING APPARATUS

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Application May 11, 1940, Serial No. 334,524

6 Claims. (Cl. 242—25)

This invention relates to wire coating apparatus, and more particularly to wire electroplating apparatus.

Objects of the invention are to provide a compact, efficient and conveniently controllable apparatus for coating wires.

One embodiment of the invention contemplates the provision of an apparatus for electroplating a metallic coating upon a plurality of wires simultaneously, in which a plurality of wire supply spools are arranged in a row on one side of an elongated tank containing the plating baths, and a corresponding number of wire take-up spools are similarly arranged on the opposite side of the tank, each take-up spool being directly opposite its associated supply spool. Means are provided whereby each take-up spool and its associated supply spool may be controlled independently of the others from either side of the plating tank.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which

Fig. 1 is a plan view, partly broken away, of a wire electroplating apparatus embodying the invention;

Fig. 2 is an elevational view thereof, looking from the take-up spool side of the apparatus;

Fig. 3 is an enlarged vertical sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary elevational view, partly in section, looking from the take-up spool side of the apparatus and showing one of the series of take-up spools, and

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 3.

The apparatus illustrated in the drawings is adapted to electroplate a metallic coating upon ten wires simultaneously; and for convenience in tracing the course of the ten wires, they are individually designated in the drawings by the reference numerals 1 to 10, respectively.

As shown in Figs. 1 and 2, the apparatus comprises an elongated tank 11, which houses the usual cleaning and plating baths through which the several wires are drawn simultaneously. The tank is supported by a rigid understructure comprising a pair of horizontal angle bars 12, 12 fixed to a series of vertical standards or legs 13, 13. A plurality of wire supply spools 14, 14 are arranged in a row below the tank and along one side thereof, and a corresponding number of wire take-up spools 15, 15 are similarly arranged along the opposite side of the tank with each take-up spool positioned directly opposite a supply spool. The number of wire supply and take-up spools will, of course, depend upon the number of wires that it is desired to electroplate simultaneously. Therefore, the apparatus illustrated in the drawings comprises ten wire supply spools, one for each of the ten wires, and ten wire take-up spools, although only five of each are shown in Figs. 1 and 2.

At the wire entrance end of the tank, there is provided a set 17 of wire guiding sheaves, hereinafter referred to as reversing sheaves, there being one such sheave for each wire. These reversing sheaves are of varying diameters and are arranged in conical formation, as shown. Also, they are mounted for rotation about a common axis, which is inclined so that the several wires are disposed in a common vertical plane as they approach the sheaves and in a common horizontal plane as they leave the sheaves. At the wire exit end of the tank, a multigroove capstan 20 is mounted upon a hollow pedestal 21. This capstan is driven by suitable means (none shown) which may be housed within the pedestal.

Above each wire supply spool 14 a wire guiding sheave 24 is rotatably supported upon a bracket 25 (Figs. 3 and 5) attached to one of the angle bars 12. These sheaves are disposed in a common vertical plane, but at different levels, as shown in Fig. 2, so that the several wires are maintained in spaced apart relationship as they advance toward the reversing sheaves. On each of the guide sheave brackets 25, with the exception of the one farthest removed from the reversing sheaves 17, there is mounted a vertically disposed wire guiding roller 27 (Fig. 5) and one or more wire guiding bushings 28, there being one bushing on each bracket for each wire that passes that bracket on its way toward the reversing sheaves. The bushings 28 keep the wires separated from each other and the vertical rollers 27 guide the wires around the brackets 25 which they pass on their way toward the reversing sheaves. After passing through the last set of bushings 28, the wires slope downwardly toward the reversing sheaves, as illustrated in Fig. 2.

Above each take-up spool 15 a wire guiding sheave 30 is rotatably supported upon a bracket 31 secured to and projecting upwardly from one of the angle bars 12. By means of these sheaves the several wires coming from the capstan 20 are directed to their respective take-up spools. On each of the sheave supporting brackets 31, with the exception of the one farthest removed from the capstan, there is mounted a horizontal wire supporting roller 33 (see Fig. 1). These rollers extend transversely above the tank 11 and serve

to prevent sagging of the wires between the capstan and the guide sheaves 30.

As hereinafter described more in detail, the several take-up spools are driven by separate belt and pulley drives connected to a common horizontal shaft 35 which extends longitudinally of and underneath the tank, as shown in Figs. 2 and 3. This shaft is journaled at one end in the pedestal 21 and its opposite end is journaled in a bearing bracket 36 secured to one of the angle bars 12. Any suitable means (none shown) may be provided for driving the shaft 35, and this driving means may be housed within the pedestal 21.

A reciprocatory wire guide 38 is associated with each of the take-up spools for distributing the wire thereon in uniform layers. The several wire guides are attached to and actuated by a common reciprocatory bar 39 which, in turn, is operated in a well known manner by a double threaded shaft 40 (Fig. 2) geared to the shaft 35. The bar 39 is slidably supported by a series of rollers 41, 41 (Figs. 3 and 4) mounted in guide blocks 42, 42 attached to the vertical standards 13.

From the above description of the general arrangement of the several parts of the apparatus, it will be understood that each wire passes upwardly from its supply spool 14, over the associated guide sheave 24, around one of the reversing sheaves 17, through the cleaning and plating baths in tank 11, around the capstan 20, and then over one of the guide sheaves 30 to the takeup spood 15 positioned directly opposite the supply spool from which the wire is drawn. Thus, the supply and take-up spools for each wire are positioned directly opposite each other. This provides a practical arrangement whereby each of the several take-up spools with its associated supply spool may conveniently be controlled from either side of the apparatus, as hereinafter described.

As best shown in Fig. 5, each supply spool 14 is mounted for rotation by being clamped between conical portions 44 and 45 of arbors 46 and 47, respectively. These arbors are rotatably journaled in the vertical standards 13, and arbor 46 is axially movable toward and away from arbor 47 to clamp or release the supply spool. A clamping screw 48 is adapted to be inserted through arbor 46 and is equipped with a handwheel 49 for screwing it into arbor 47, whereby arbor 46 is shifted toward arbor 47 to clamp the supply spool therebetween.

A brake drum 52 is keyed to arbor 47 and a brake shoe 53 is yieldably pressed against the periphery of the drum to constantly maintain the necessary braking action or drag on the supply spool. The brake shoe is pivotally carried by a horizontal bar 55 which is pivoted at 56 to the vertical standard 13. An adjustable spring 57 (Figs. 3 and 4) is connected to bar 55 so as to yieldably press the brake shoe against the brake drum. Opposite ends of the lever project toward opposite sides of the apparatus for convenient manipulation of the lever from either side of the apparatus for the purpose of increasing or decreasing the drag on the supply spool, when desired. A handwheel 58 is provided on arbor 47 to facilitate manual rotation of the supply spool, when necessary.

Referring particularly to Fig. 4, it will be seen that each take-up spool 15 is mounted for rotation by being clamped between conical portions 59 and 60 of arbors 61 and 62, respectively, rotatably journaled in the vertical standards 13. Arbor 61 is axially movable toward and away from arbor 62 to clamp or release the take-up spool. A clamping screw 63 is adapted to be inserted through arbor 61 and is equipped with a handwheel 64 for screwing it into arbor 62, whereby arbor 61 is shifted toward arbor 62 to clamp the supply spool therebetween. Another handwheel 65 is provided on the arbor 62 to facilitate manual rotation of the take-up spool, when necessary. Each take-up spool is, however, adapted to be power driven through a belt and pulley drive connection with the horizontal drive shaft 35. This drive connection comprises a pulley 67 on take-up spool arbor 62, a pulley 68 on drive shaft 35, and an interconnecting driving belt 69. For each take-up spool driving belt, a belt tightener is provided which comprises a belt engaging roller 71 (Fig. 3) carried by one arm of a lever 72, to the opposite arm of which there is connected an adjustable spring 73 for normally pressing the roller against the belt with sufficient force to apply the desired driving torque to the take-up spool.

Each belt tightener has associated therewith a manually operable control bar 75 which is pivotally connected intermediate its ends to the belt tightener lever 72. Each bar 75 is mounted for endwise movement transversely of the apparatus and is provided with a handle 76 at each end for the convenient manipulation thereof from either side of the apparatus, as best shown in Fig. 3. One end portion of each bar is slidable in a slotted guide plate 78 depending from one of the angle bars 12. The opposite end portion of each bar has a latch collar 80 attached thereto which is slidable in a cooperating latch block 81 fixed to the adjacent vertical standard 13.

The spring 73 tends to shift bar 75 toward the supply spool side of the apparatus, while pressing the roller 71 against the take-up spool driving belt 69. By means of either handle 76, bar 75 may be manually shifted toward the take-up spool side of the apparatus to thereby retract the belt tightener roller, whereupon the bar may be tilted slightly to interengage a projection 83 on latch collar 80 with a cooperating lip portion 84 of latch block 81, whereby the belt tightener roller is locked in the retracted position. Upon releasing the latch collar from the latch block, the spring 73 restores the bar 75 to its original position as it again presses the belt tightener roller against the take-up spool driving belt.

From the above description it will be apparent that any one or more of the take-up spools may be stopped without interrupting rotation of the others. Moreover, by means of the double handled take-up spool control bars 75, each of the several take-up spools is conveniently controllable from either side of the apparatus, and by means of the supply spool brake actuating bars 55, each of the several supply spools is also conveniently controllable from either side of the apparatus. Furthermore, by arranging the take-up spools directly opposite corresponding supply spools, the supply and take-up spool control bars 55 and 75 for each wire are conveniently accessible for simultaneous manipulation by a single attendant, so that any one of the take-up spools and its associate supply spool may be stopped simultaneously and very quickly when necessary, for example, in order to make repairs or replacements.

It is believed that the operation of the apparatus will be clearly apparent from the above description when read in conjunction with the accompanying drawings. It should be under-

stood, however, that the novel features of the invention are not limited to the particular embodiments thereof herein illustrated and described, except insofar as is defined by the appended claims.

What is claimed is:

1. In a wire handling apparatus, a support, a wire supply spool mounted on one side of the support, a wire take-up spool mounted on the opposite side of the support, said wire supply and take-up spools being inaccessible to each other, and manually operable means accessible from either side of the support for controlling said supply and take-up spools.

2. In a wire treating apparatus, a support, a wire supply spool rotatably mounted on one side of the support, a brake for said spool, a wire take-up spool mounted on the opposite side of said support opposite said supply spool, driving means for said take-up spool, and manually operable means accessible from either side of said support for controlling said brake and said driving means.

3. In a wire treating apparatus, an elongated support, a plurality of wire supply spools arranged in a row along one side of the support, a separate take-up spool for each supply spool, said take-up spools being arranged opposite their respective supply spools, and means for individually controlling each of said take-up spools from either side of said tank.

4. In a wire treating apparatus, an elongated support, a series of wire supply spools arranged in a row along one side of the support, a series of wire take-up spools, one for each supply spool, arranged in a row along the opposite side of the support with each take-up spool positioned directly opposite its associated supply spool, a separate driving means for each take-up spool, and separate means accessible from either side of the apparatus for controlling the driving means of each of said take-up spools.

5. In a wire handling apparatus, an elongated support, a series of wire supply spools arranged in a row along one side of the support, a series of wire take-up spools, one for each supply spool, arranged in a row along the opposite side of the support with each take-up spool positioned directly opposite its associated supply spool, a brake for each supply spool, a driving means for each take-up spool, a manually operable brake control member for each supply spool, and a manually operable driving means control member for each take-up spool, said brake and driving means control members being conveniently accessible from either side of the support.

6. In a wire handling apparatus, a support, a wire supply spool on one side of said support, a brake for the supply spool, a take-up spool on the opposite side of the support and opposite the supply spool, driving means for the take-up spool, a manually operable member for controlling the brake, and a manually operable member for controlling the driving means, said brake and driving means control members being conveniently accessible from either side of the support.

ALVIN N. GRAY.